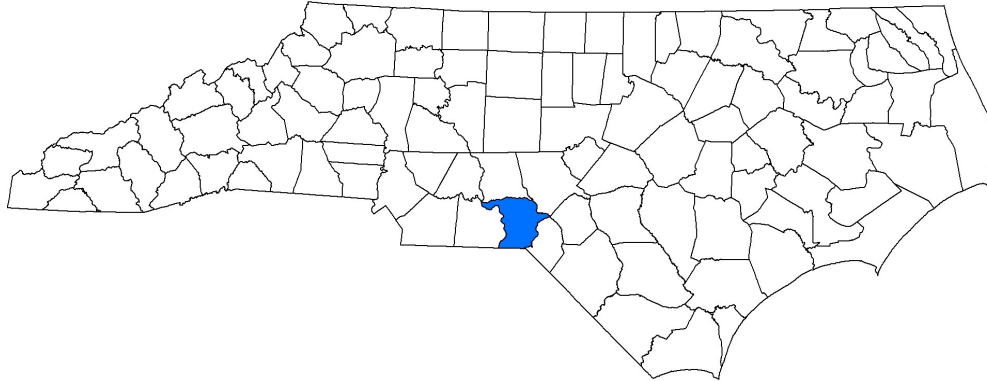


# ANNUAL REPORT FOR 2010



**Myrick Pond Mitigation Site**  
**Richmond County**  
**TIP No. R-2231**



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## SUMMARY

The following report summarizes the monitoring activities that have occurred in 2010 at the Myrick Pond Mitigation Site. The 2010 monitoring year represents the fourth year of hydrologic and vegetation monitoring following construction. The site must demonstrate hydrologic and vegetation success for a minimum of five years or until the site is deemed successful. The site was constructed to compensate for impacts associated with the US 220 Ellerbe Bypass in Richmond and Montgomery Counties, specifically in the Lumber River Basin (03040203) Hydrologic Unit Code (HUC).

In February 2007, groundwater monitoring gauges were installed to monitor hydrology on the site. Five groundwater gauges and one rain gauge were positioned on the restoration site.

Hydrologic success criteria are based on the approved mitigation plan and require that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall.

The 2010 year represents the fourth year of hydrologic monitoring for the Myrick Pond Mitigation Site. All five groundwater restoration gauges recorded jurisdictional hydrology above the required 12.5% of the growing season and met the success criteria for 2010.

There were three vegetation monitoring plots established throughout the 2.45-acre planting area. The 2010 vegetation monitoring of the site revealed an average tree density of 435 trees per acre, which is well above the minimum success criteria of 290 trees per acre for year four.

A site visit was conducted on August 12, 2010 with the regulatory agencies and NCDOT personnel present. It was determined at that meeting that the site success criteria had been met and that no further monitoring would be required. NCDOT committed to completing a final monitoring report detailing the fourth year monitoring data. As a result of that meeting, NCDOT ceased hydrologic monitoring and the data presented in the fourth year monitoring report is detailed only through August 12<sup>th</sup>. The vegetation data was completed as usual and is contained in this final report.

Reoccurring beaver activity has been observed at the Myrick Pond Mitigation Site during the 2010 monitoring season. USDA has continuously removed the beavers from the site as necessary. It was agreed at the August 12<sup>th</sup> meeting that no further beaver management would be conducted at the site.

Based on the on-site meeting and results from the fourth year of monitoring, NCDOT has ceased all monitoring activities at the Myrick Pond Mitigation Site.

## 1.0 INTRODUCTION

### 1.1 Project Description

The Myrick Pond Mitigation Site serves as mitigation for TIP No. R-2231 US 220 Ellerbe Bypass in Richmond and Montgomery Counties (Figure 1). The 13.6-acre site is located in Richmond County, approximately 42 miles south of the city of Asheboro. The site includes 9.40 acres of open water, 2.45 acres of emergent and riparian wetlands, 1.90 acres of upland pine plantation, and 817 linear feet of onsite stream restoration. The site was constructed to compensate for impacts associated with the US 220 Ellerbe Bypass in Richmond, specifically in the Lumber River Basin (Hydrologic Unit Code 03040203).

### 1.2 Purpose

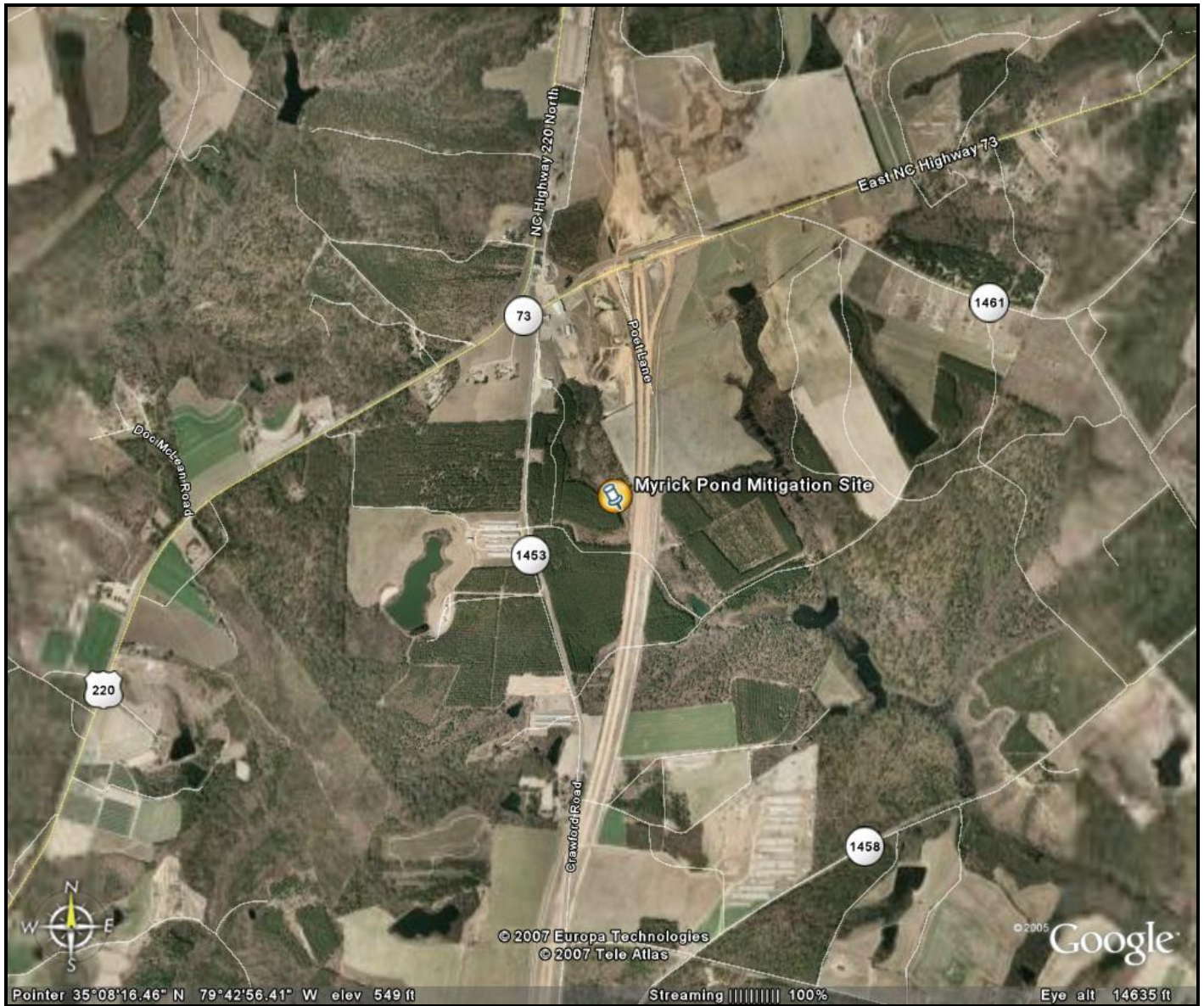
In order to demonstrate successful mitigation, hydrologic and vegetation monitoring must be conducted for a minimum of five years or until the site is deemed successful. Vegetation success criteria state that at least 320 trees/acre must survive through year three. A ten percent mortality rate will be accepted in year four (288 trees/acre) and another ten percent in year five, resulting in a required survival rate of 260 trees/acre through year five. Hydrologic success criteria are based on the approved mitigation plan, which requires that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall. This report includes analyses of hydrologic and vegetation monitoring results, discussions of local climatic conditions throughout the growing season, and site photographs.

### 1.3 Project History

Winter 2004	Site Planted
September 2005	Stream Construction Completed
December 2006	Site Replanted
July 2007	Stream and Vegetation Monitoring (Year 1)
March-November 2007	Hydrologic Monitoring (Year 1)
July 2008	Stream and Vegetation Monitoring (Year 2)
March-November 2008	Hydrologic Monitoring (Year 2)
June 2009	Stream and Vegetation Monitoring (Year 3)
March-November 2009	Hydrologic Monitoring (Year 3)
June 2010	Stream and Vegetation Monitoring (Year 4)
March-November 2010	Hydrologic Monitoring (Year 4)

## 1.4 Debit Ledger

The entire Myrick Pond mitigation site was used for the R-2231B project to compensate for unavoidable stream and wetland impacts.



**Figure 1. Site Location Map**

## **2.0 HYDROLOGY**

### **2.1 Success Criteria**

The hydrologic success criteria established for Myrick Pond Mitigation Site, as stipulated in the approved mitigation plan and subsequent revisions, require that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall.

The growing season in Richmond County begins on March 25 and ends November 4. These dates correspond to a 50% probability that air temperature will drop to 28°F after March 25 or before November 4<sup>1</sup>. The growing season is 225 days; therefore, hydrologic success requires 12.5% saturation during this period, or at least 28 consecutive days.

### **2.2 Hydrologic Description**

Five groundwater monitoring gauges were installed on the site (Figure 2) in February 2007 in the emergent wetland. A rain gauge is also located on the site to assist in comparison of the rainfall data (supplied by the NC State Climate Office) from an official weather station in Hoffman. The groundwater gauges record water levels on a daily basis. Monitoring data for 2010 represents the third year of hydrologic monitoring for the site.

### **2.3 Results of Hydrologic Monitoring**

#### **2.3.1 Site Data**

The maximum number of consecutive days that saturation occurred within 12 inches of the ground surface was determined for each groundwater monitoring gauge. This number was converted into a percentage of the 225-day growing season (March 25 – November 4). Table 1 provides the 2010 hydrologic results; Figure 3 is a graphical representation of these results. Appendix A includes graphs of the data recorded at each groundwater gauge. Daily rainfall events recorded at the onsite rain gauge are included on each of the groundwater gauge plots.

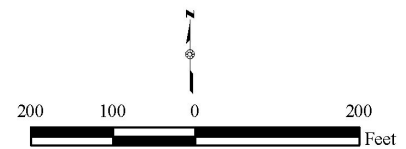
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<sup>1</sup> Natural Resources Conservation Service, Soil Survey of Richmond County, North Carolina, 1999.

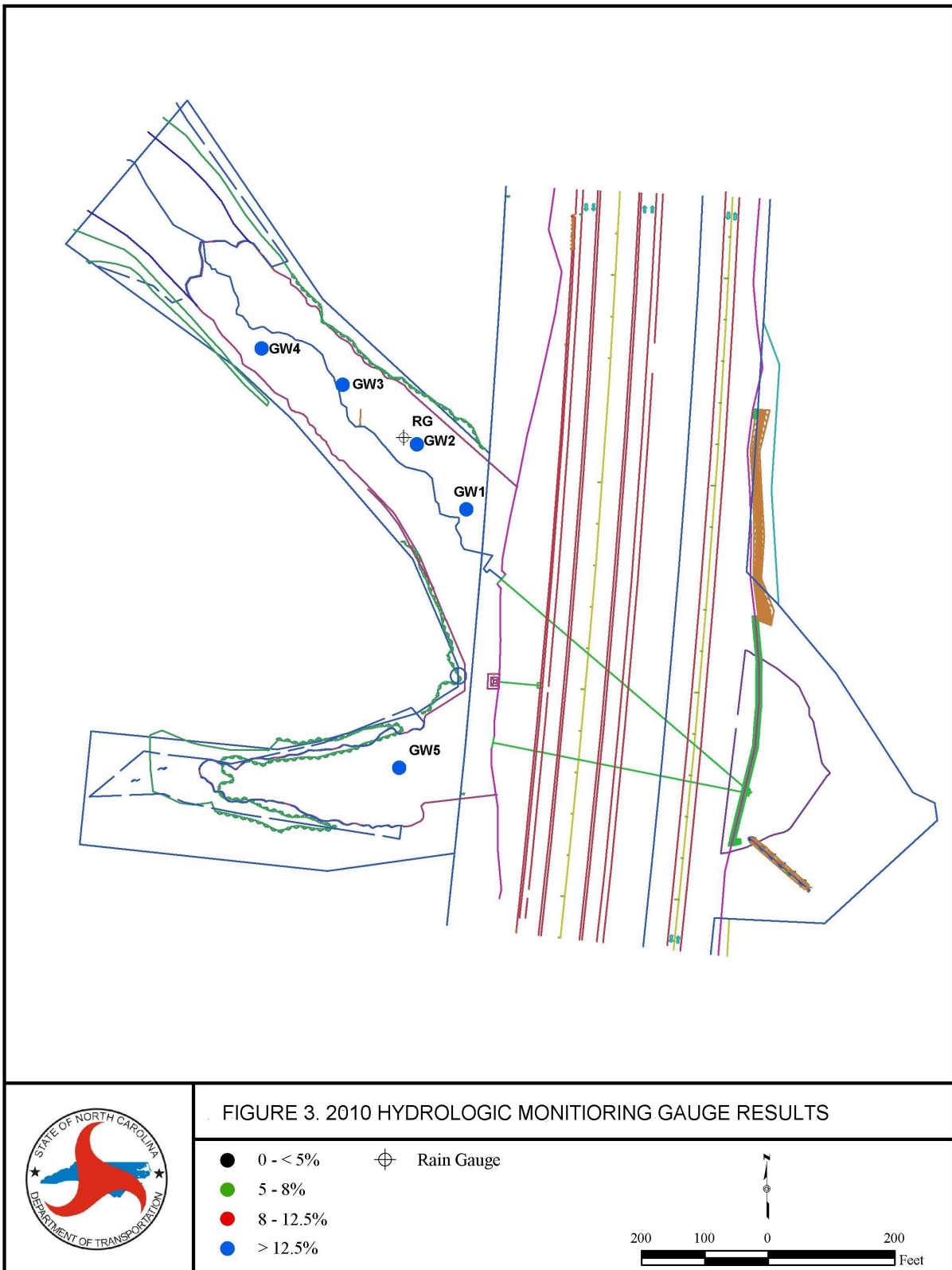


**Figure 2. Gauge Location Map**

- Groundwater Gauge
- ⊕ Rain Gauge







**Table 1.** Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5-8%	8-12%	> 12.5%	Actual %	Success Dates
MPGW-1+				X	62.1	March 25 - Nov 4
MPGW-2+				X	24.7	March 25 - Nov 4
MPGW-3+				X	62.1	March 25 - Nov 4
MPGW-4+				X	62.1	March 25 - Nov 4
MPGW-5+				X	40.1	March 25 - Jun 26 Jul 10 - Nov 4

+Gauge met success during average rainfall months (January, February, May, June and July).

**Table 2.** Hydrologic Monitoring Results 2007-2010

Monitoring Gauge	2007 Results	2008 Results	2009 Results	2010 Results
MPGW-1	100.0	100.0	100.0	62.1
MPGW-2	100.0	100.0	100.0	24.7
MPGW-3	90.4	100.0	100.0	62.1
MPGW-4	90.4	100.0	100.0	62.1
MPGW-5	53.0	32.2	49.3	40.1
Climate Conditions	Below Average Rainfall	Average Rainfall	Average/ Below Average	Average Rainfall

### 2.3.2 Climatic Data

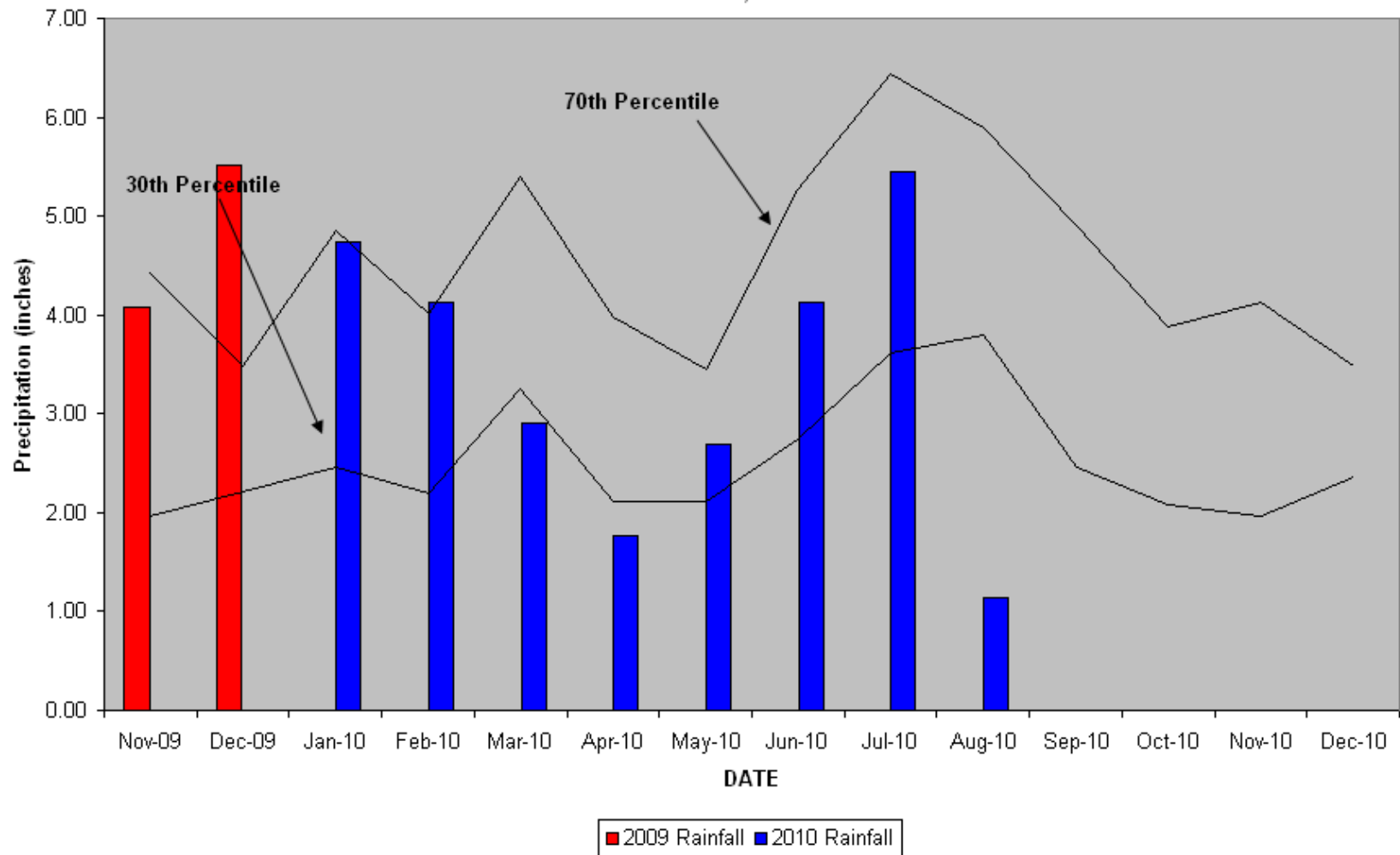
Figure 4 is a comparison of the 2010 monthly rainfall to the historical precipitation (collected between 1977 and 2009) for Hoffman, North Carolina. This comparison gives an indication of how 2010 relates to historical data in terms of climatic conditions. The NC State Climate Office provided all historical rainfall information. For 2010, March and April recorded below average rainfall. The months of January, February, May, June and July recorded average rainfall. Overall, 2010 was an average rainfall year.

## 2.4 Conclusions

The 2010 monitoring year represents the fourth year of hydrologic monitoring for the Myrick Pond Mitigation Site. All five groundwater monitoring gauges recorded jurisdictional hydrology above the required 12.5% of the growing season.

NCDOT has discontinued all hydrologic monitoring at the Myrick Pond Mitigation Site.

Myrick Pond  
Figure 4 (30-70 Percentile Graph)  
Norman, NC



### **3.0 VEGETATION: MYRICK POND MITIGATION SITE (YEAR 4 MONITORING)**

#### **3.1 Success Criteria**

Success criteria have been established to verify that the wetland mitigation areas support vegetation necessary for a jurisdictional determination. Specifically for bottomland hardwood areas, a minimum mean density of 320 trees/acre is required 3 years after initial planting. The required survival criterion will decrease by 10 percent per year after the third year of vegetation monitoring (i.e., for an expected 290 stems per acre for Year 4 and 260 stems per acres for Year 5).

#### **3.2 Description of Species**

The following tree species were planted in the wetland restoration area:

*Salix nigra*, Black Willow

*Cornus amomum*, Silky Dogwood

*Alnus serrulata*, Tag Alder

*Liriodendron tulipifera*, Yellow Poplar

*Platanus occidentalis*, Sycamore

*Quercus nigra*, Water Oak

*Fraxinus pennsylvanica*, Green Ash

### 3.3 Results of Vegetation Monitoring

**Table 3.** Vegetation Monitoring Results

Plot #	Black Willow	Silky Dogwood	Tag Alder	Yellow Poplar	Sycamore	Water Oak	Green Ash	Total (4 year)	Total (at planting)	Density (Trees/Acre)
1	3		1	8	6		8	26	37	478
2					14		1	15	34	300
3	2	1			25	2	1	31	40	527
Average Density (Trees/Acre)										435

**Site Notes:** Beaver activity continues to be an ongoing issue at the Myrick Pond Site. NCDOT is continually working with USDA beaver trappers to minimize the beaver activity on site. Vegetation Plot #2 was inundated with water due to beaver activity at the time of the monitoring evaluation. Photo point #5 could not be taken due to the high water. All beaver dams have been breached as of August 2010. Other species noted: *Juncus* sp., red maple, goldenrod, cattail, tear thumb, cut grass, sedge, smartweed, briars, pokeberry and various grasses.

### 3.4 Conclusions

There were three vegetation monitoring plots established throughout the 2.45 acre planting area. The 2010 vegetation monitoring of the site revealed an average tree density of 435 trees per acre, which is well above the minimum success criteria of 290 trees per acre for year four. NCDOT has ceased all vegetation monitoring at the Myrick Pond Mitigation Site.

#### **4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS**

The 2010 year represents the fourth year of hydrologic monitoring for the Myrick Pond Mitigation Site. All five groundwater restoration gauges recorded jurisdictional hydrology above the required 12.5% of the growing season and met the success criteria for 2010.

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## **APPENDIX A**

### **GAUGE DATA GRAPHS**

## **APPENDIX B**

### **PHOTO AND VEGETATION PLOT LOCATIONS AND SITE PHOTOS**



# Myrick Pond



Photo Point #1 (Upstream)



Photo Point #1 (Downstream)



Photo Point #2 (Upstream)



Photo Point #2 (Downstream)



Photo Point #3 (Upstream)



Photo Point #3 (Downstream)

June 2010



# Myrick Pond



Photo Point #4 (Upstream)



Photo Point #4 (Downstream)



Photo Point #6 (Looking Towards Vegetation Plot 1)



Photo Point #6 (Looking Towards Vegetation Plot 2)



Photo Point #7 (Looking Downstream at the Outlet End of the Box Culvert)

June 2010



# MYRICK POND MITIGATION SITE

